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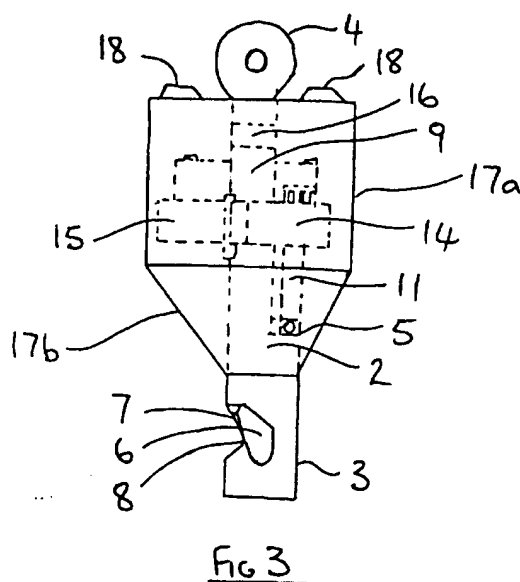
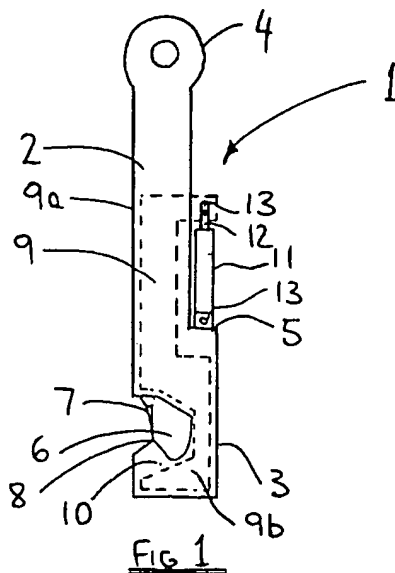
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(54) A crane hook having a remotely controlled ejection lever

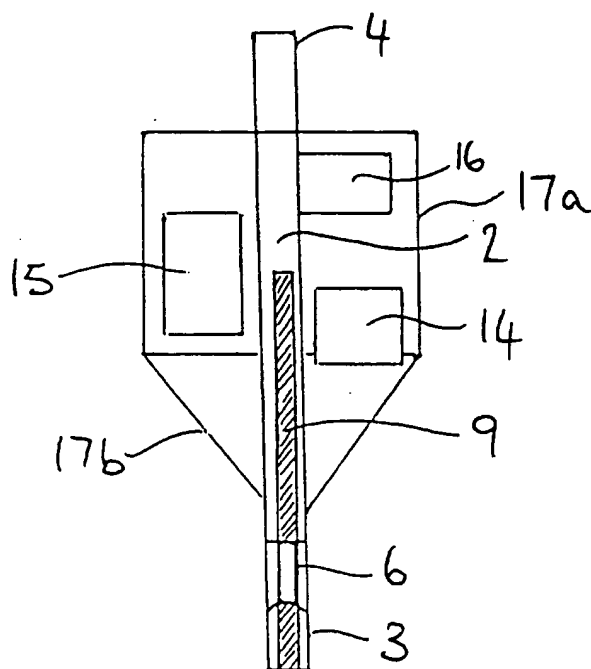
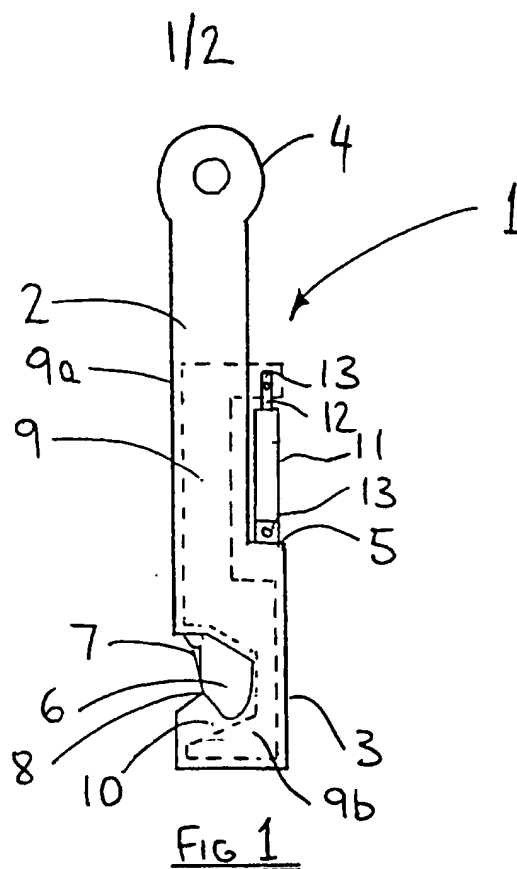
(57) A crane hook 1 has a sliding ejection lever 9, fitted into a hollow elongate shank member 2, operated by a hydraulic cylinder 11 which is remotely controlled. End 9b lifts, for example, guide ropes clear of recess 6 when the ejection lever 9 is raised, thereby ejecting the guide ropes from hook member 3. When raising a load the guide ropes are selectively retained within recess 6 by tongue 7 which depends from ejection lever 9 and extends to lip 8. Once the load is grounded the remote control is operated which activates control means 16 thereby causing power source 15, eg a 12v thixotropic gel maintenance free battery, to supply power to hydraulic pump 14 which selectively operates hydraulic cylinder 11. Strobe lights 18 provides a visual warning indicator to an operator and other workers and an audible alarm may be fitted on housing 17 to inform the operator that the load is properly located on the hook.

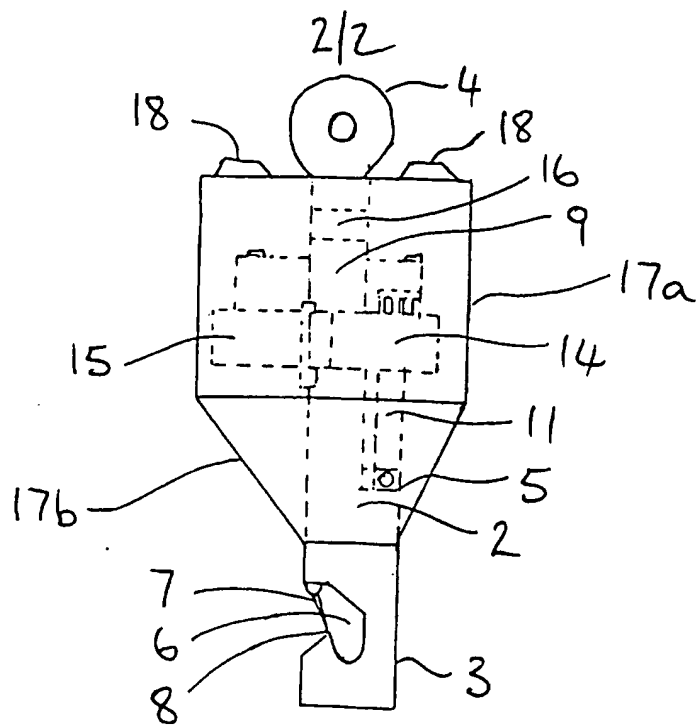
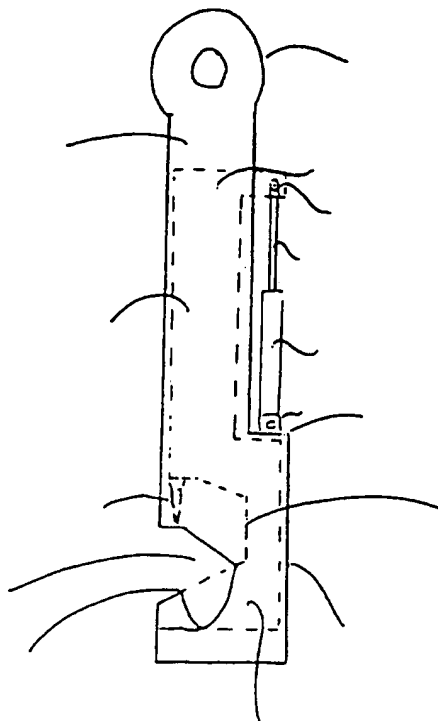


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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995



FIG 3FIG 4

2293407CRANE HOOK

5 This invention relates to a crane hook and more particularly to a crane hook with a remote controlled load-displacement ejection lever.

10 With many prior art crane hooks, the loads have to be placed on and removed from the hook manually by a crane operator. This can be cumbersome and difficult and at times can be dangerous for the operator.

15 The operation of some prior art crane hooks is partially automated. In these cases the operator has still to attach the load to the hook, but the manual release operation is eliminated thus making the operation less dangerous.

20 DE Patent No 2757321 and FR Patent No 2411795 describes a safety arrangement for a crane hook which automatically releases the load from the hook on deposition upon the ground.

25 SU Patent No 578257 describes a self engaging crane hook which comprises a housing with two hook mouths for ropes. One of the hook mouths has a rope retaining mechanism which includes a movable support. The rope ejecting mechanism consists of a spring loaded push-rod. The top position of the push-rod is limited by a nut, while the
30 bottom position is determined by a double arm lever tensioned by the spring. When the hook with the load descends, the load rests on a receiving platform, while the hook descends further until the plunger touches the load thus rotating the lever and releasing the spring
35 loaded push-rod which ejects the rope(s).

One of the disadvantages of the prior art crane hooks is that the hooks automatically release the load upon

deposition. Therefore if the load is in the wrong place, it has to be placed back on the hook before it can be moved.

- 5 The aim of the present invention is to provide a crane hook which obviates or mitigates the aforementioned disadvantages.

10 According to this invention, there is provided a crane hook having a hook displacement ejection means, means for remotely controlling said ejection means, the control means allowing movement of the ejection means between first and second positions so as to selectively eject a load carried by the hook.

15 This invention is described below, by way of example only with reference to the accompanying drawings which illustrate one specific embodiment only.

20 Figure 1 is a side view of the shank member of a crane hook according to one embodiment of the invention.

Figure 2 is a front view of the crane hook of Figure 1.

25 Figure 3 is a side view of the crane hook of Figure 1.

Figure 4 is a side view of the crane hook of Figure 1 in the ejection position.

30 A remote controlled crane hook 1 as shown in the figures comprises a substantially rectangular, hollow and elongate shank member 2 which is formed at one end to provide a hook member 3 and the end remote from said hook member 3 is provided with a crane mounting means 4 such as a
35 clevis. The shank member 2 may be formed from two side plates, the edges are folded to enable them to be welded together. A spacer is mounted adjacent the clevis 4 of

the shank member 2 between the two side plates to maintain the spacing between the plates. The shank member 2 as shown is approximately 1m in length and 0.60 mm in width, but varies depending on the overall size of the crane hook.

A shoulder 5 is provided in the rear surface of the shank member 2 approximately midway between the hook member 3 and the clevis 4.

The hook member 3 is defined by a recess 6 in the lowermost portion of the shank member 2. The recess 6 is generally U-shaped in cross-section with outwardly flared edges as shown in Figure 1 and is provided in the front face of the shank member 2 below the shoulder 5.

A load displacement ejection lever 9 is slidably located within the shank member 2 and is mounted for vertical reciprocation therein. The load displacement ejection lever 9 is of similar shape to the shank member 2 but is of slightly less diameter than the said shank member 2 in order to allow the ejection lever 9 to be slidably movable therein.

An aperture is provided in one side of the shank member 2 between the shoulder 5 and the clevis 4 through which the upper portion of the ejection lever 9a extends at right angles. A fixing means 13 is provided on the upper portion of the ejection lever 9a which will be further explained below.

An elongate, movable tongue portion 7 depends from the ejection lever 9, within the recess 6 and extends to the lip 8 of the recess to selectively close the recess 6.

The lower portion of the ejection lever 9b is substantially rectangular and is provided with a substantially C-shaped recess 10 which corresponds

generally in position to the recess 6 in the front face of the shank member 2.

5 A hydraulic cylinder 11 is mounted on the shoulder 5 in the rear surface of the shank member 2. A piston 12 extends from the cylinder 11. The upper portion of the cylinder is attached to the fixing means 13 on the upper portion of the ejection lever 9a such that as the piston 12 is moved in and out of the cylinder 11 the ejection
10 lever 9 is raised and lowered within the shank member 2.

A drive means for example a hydraulic pump 14 is mounted on the exterior surface of the shank member 2 and is connected via suitable circuitry to a suitable power
15 source 15 (such as a battery) mounted adjacent thereto, and the hydraulic cylinder 11 mounted on the shank member 2. The battery may be a 12 volt maintenance free battery using thixotropic gel to prevent any spillage which could be caused by a conventional acid battery. The hydraulic
20 pump 14 selectively forces hydraulic fluid into the cylinder 11 to advance and retract the piston 12.

The power source 15 is operable by known control means 16 such as infra-red or radio control, compressed air,
25 mechanical or hydraulic control means which receives signals transmitted from a remote control unit held by the operator. The control means 16 receives signals either to activate or deactivate the power source 15. The remote control transmitter and receiver/decoder will be a 3
30 channel, 2 switch, high security radio transmitter key. The receiver will decode the received signals and only operate if the received data is correct.

35 The power source 15, drive means 14, control means 16 and the shank member 2 are substantially enclosed in a housing 17 which can be formed of any suitable material. The housing is substantially rectangular in shape with the clevis 4 extending through the top of the uppermost

section 17a. The lowermost section 17b of the housing is substantially frustoconical in cross section and has the hook member 3 of the crane hook 1 extending through the leading edge.

5

Strobe lights 18, the function of which will be explained below are mounted on the upper surface of the housing 17 on either side of the clevis 4. The strobe lights 18 may be powered by the power source 15 located within the housing 17.

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In use of the aforementioned crane hook 1, when it is necessary to transfer a load from one position to another, the operator first ensures that the ejection lever 9 is in the lowered position within the shank member 2 as shown in Figure 1. In this position the recesses 6, 10 in the shank member 2 and the ejection lever 9 are aligned in order to allow the supporting hooks or slings of the load to be inserted onto the hook member 3.

20

The operator then attaches the load to the hook member 3 by passing the sling or other fixing means into the recesses 6,10. The movable tongue portion 7 ensures that the guide ropes are securely passed into the recesses 6,10 and the guide ropes then pass into the U-shaped recess 6 in the shank member 2, thereby eliminating premature release of the load whilst lifting is in progress.

25

The crane is then operated to lift the load from the pick-up position to a selected delivery position. To ensure total failsafe operation of the crane hook the hydraulic power pack pressure is adjustable from 0 psi to 2,500 psi and therefore can be set to eject only the weight of the slings, chains or ropes etc. Once the load is in the required position it can be lowered onto the ground by normal operation of the crane. If the operator subsequently decides that the load is not in the final position, the crane is simply operated again to raise the

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load as above. The load being carried, ie containers etc, must be lowered onto the ground and the slings hanging slack before the hook is able to eject them. If, in the unlikely event, of a malfunction of the power pack the
5 hook can be used as a conventional hook as there is no danger of a load falling off the conventional hook shape.

At this point the power source 15 is deactivated and the hydraulic unit 14 is in the normal rest position with the
10 piston 12 withdrawn within the cylinder 11. Once the load has been placed on the ground the control means 16 in the crane hook 1 is activated via the remote control unit held by the operator. The control means 16 in turn activates the power source 15 causing the hydraulic unit 14 which is
15 attached to the shank member 2 to selectively force hydraulic fluid into the hydraulic cylinder 11. This movement of hydraulic fluid forces the piston 12 out of the cylinder 11 and subsequently moves the load displacement ejection lever 9 within the shank member. As
20 the ejection lever moves up within the shank member the moveable tongue portion is also drawn within the shank member.

Furthermore, as the ejection lever 9 is raised, the guide
25 ropes holding the load are lifted clear of the bottom of the recess 6 in the shank member 2 and supported along the lowermost tapered side of the recess 10a of the ejection lever 9. As the ejection lever 9 is raised further, the guide ropes are lifted out of the U-shaped recess 6 and
30 slide along the tapered side 10a of the recess in the ejection lever 9 until the guide ropes pass unhindered (by the fact that the moveable tongue portion 7 has now been drawn fully within the shank member) over the lip 8 of the shank member recess 6, thereby ejecting the guide ropes of
35 the load from the hook member 3.

Following displacement of the load from the hook member 3, the operator of the crane sends a signal from the remote

control unit to the receiver 16 in the housing 17 to deactivate the power source 15 and the hydraulic unit 14 returns to its rest position.

5 It is envisaged that whilst the hook 1 is in operation the
strobe lights 18 will be activated in order to serve as a
visual indicator to the operator and other workers in the
general vicinity of the crane. As a further safety means,
an audible alarm may be fitted to the housing 17 to be
10 operated whilst the hook is in operation, thereby
informing the operator when a load is properly located on
the hook.

It is to be understood that each hook will have its own
15 separate code and therefore can be used in the same area
as any other hooks with complete safety, as no other
transmitter can operate any other hook. Furthermore each
unit will be tested for electromagnetic compatibility to
conform with EEC Regulations to ensure that strong R F
20 fields do not result in interference and to ensure the
unit itself does not produce strong electromagnetic
fields.

One advantage of this invention is that although the load
25 has to be manually placed onto the crane hook, the load
can be displaced without the operator leaving the crane.
Furthermore this invention has the further advantage that
the hook does not automatically displace the load on
contact with the ground thus allowing the load to be
30 relifted and placed somewhere else without having to
replace the load again. This is especially useful in an
emergency situation where the transfer of a load may have
to be interrupted before the load reaches the final
destination.

35 Furthermore, the flared edges of the hook member prevents
fraying of the guide ropes which can be a common problem
in hooks with straight edges.

Claims

1. A crane hook having a load displacement ejection means, means for remotely controlling said ejection means,
5 the control means activating movement of the ejection means between first and second positions so as to selectively eject a load carried by the hook.
2. A crane hook according to claim 1 wherein the crane
10 hook is provided with a shank member which is formed at one end to provide a hook member and has a means for mounting the hook onto a crane at the other.
3. A crane hook according to claim 2 wherein the shank
15 member includes two side plates, the edges of which are folded to enable them to be joined together.
4. A crane hook according to claim 3 wherein a spacer is
20 mounted between the side plates.
5. A crane hook according to any one of claims 2, 3 or 4 wherein the shank member is further provided with a shoulder member.
- 25 6. A crane hook according to any one of claims 2 to 5 wherein the load displacement means is slidably located within the shank member.
- 30 7. A crane hook according to claim 6 wherein the load displacement means is mounted in such a way as to enable vertical reciprocation within the shank member.
- 35 8. A crane hook according to claims 6 or 7 wherein the load displacement means is in the form of an ejection lever.

9. A crane hook according to claim 8 wherein the ejection lever has a movable tongue portion depending from it which selectively masks the hook member.

5 10. A crane hook according to any one of the preceding claims wherein the control means comprises a drive motor.

10 11. A crane provided with a crane hook comprising a load ejection means, means for remotely controlling said ejection means, the control means activating movement of the ejection means between first and second positions so as to selectively eject a load carried by the hook.

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Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

- (i) UK Cl (Ed.N) E2A (AHH)
(ii) Int Cl (Ed.6) B66C 1/38; F16B 45/00, 45/02, 45/04

Search Examiner
MIKE McKINNEY

Date of completion of Search
21 JULY 1995

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant
following a search in respect of
Claims :-
1 to 11

(ii) ONLINE: WPI

Categories of documents

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| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&: Member of the same patent family; corresponding document.</p> |
|--|---|

Category	Identity of document and relevant passages		Relevant to claim(s)
X,Y	GB 1464319	(WALTERSCHEID) see Figure 2 and lines 70 to 98 page 3	X: 1,2,5 Y: 3,4,6-10
X,Y	GB 1184696	(LICENSSYSTEM) see Figure 1 and lines 85 to 95 page 2	X: 1,2 Y: 3,4,6-10
X,Y	WO 86/07582 A1	(HORNBERG) see Figures and lines 12 to 27 page 12	X: 1,2,11 Y: 3-10
X,Y	US 5178427	(JORRITSMA) see Figures	X: 1,2,11 Y: 3-10
X,Y	US 4664559	(BERRANG) see Figures and lines 42 to 67 column 3	X: 1,2 Y: 3-10
Y	US 3984900	(CIRELLI) see Figures	3-10

Databases:The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).